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(71) Applicant (for all designated States except US): **Montana State University [US/US]**; 304 Montana Hall, Bozeman, MT 59718-4011 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DRATZ, Edward, A. [US/US]**; 500 Concord Drive, Bozeman, MT 59715 (US). **MUMEY, Brendan, M. [US/US]**; 2485 Amica Drive, Bozeman, MT 59715 (US). **JESAITIS, Algirdas, J. [US/US]**; 27 Annette Park Drive, Bozeman, MT 59715 (US).

(74) Agents: **SILVA, Robin, M. et al.**; 4 Embarcadero Center, Suite 3400, San Francisco, CA 94111 (US).

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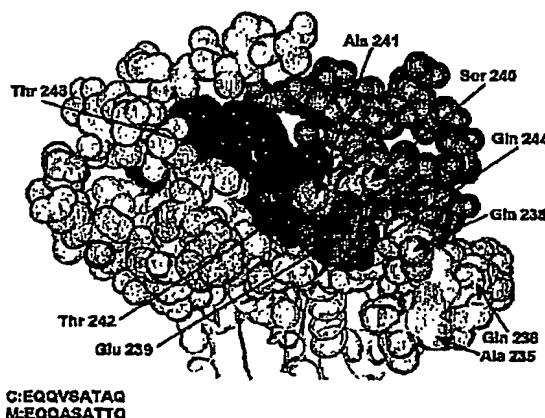
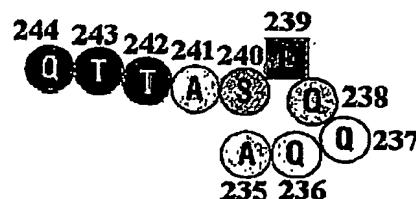
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[Continued on next page]

(54) Title: MAPPING DISCONTINUOUS ANTIBODY OR APTAMER EPITOPE FOR PROTEIN STRUCTURE DETERMINATION AND OTHER APPLICATIONS

**A**

Proposed hairpin conformation of the C3 loop residues 235-240 in rhodopsin

B

(57) Abstract: The present invention is directed to methods of mapping antibody or aptamer epitopes for use in a variety of utilities including the elucidation of the tertiary structure of proteins. A method of the invention, antibody imprinting, uses antibodies or aptamers against target proteins and random peptide probe libraries to map the epitopes of antibody binding sites on target proteins.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N33/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 01/64942 A (KUIMELIS ROBERT G ; LIPOVSEK DASA (US); PHYLOS INC (US); WAGNER RICHAR) 7 September 2001 (2001-09-07) abstract page 32, paragraph 2 page 34, last paragraph; claims 20,25</p> <hr/> <p>WO 02/46757 A (IMMUNOCLIN LAB LTD) 13 June 2002 (2002-06-13) abstract page 2, last paragraph page 6, paragraph 2</p> <hr/> <p style="text-align: center;">-/-</p>	18,19
X		18,19

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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- "P" document published prior to the international filing date but later than the priority date claimed

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- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Weijland, A

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International Application No
PCT/US2004/011905

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>INIGUEZ P ET AL: "SCREENING OF HORSE POLYCLONAL ANTIBODIES WITH A RANDOM PEPTIDE LIBRARY DISPLAYED ON PHAGE: IDENTIFICATION OF LIGANDS USED AS ANTIGENS IN AN ELISA TEST TO DETECT THE PRESENCE OF ANTIBODIES TO EQUINE ARTERITIS VIRUS"</p> <p>JOURNAL OF VIROLOGICAL METHODS, AMSTERDAM, NL, vol. 73, no. 2, 1998, pages 175-183, XP001024660 ISSN: 0166-0934 abstract table 2 page 179, left-hand column, paragraph 2</p> <p>-----</p>	18,19
P,X	<p>WO 03/087310 A (LOVE JOHN J ; MAYO STEPHEN L (US); CALIFORNIA INST OF TECHN (US)) 23 October 2003 (2003-10-23) the whole document</p> <p>-----</p>	1-19
A	<p>GREEN L S ET AL: "APTAMERS AS REAGENTS FOR HIGH-THROUGHPUT SCREENING"</p> <p>BIOTECHNIQUES, EATON PUBLISHING, NATICK, US, vol. 30, no. 5, May 2001 (2001-05), pages 1094-1095,1098,, XP001153135 ISSN: 0736-6205 the whole document</p> <p>-----</p>	1-19
X	<p>LINDBERG ET AL: "Characterization of a human protein threonine kinase isolated by screening an expression library with antibodies to phosphotyrosine"</p> <p>ONCOGENE, BASINGSTOKE, HANTS, GB, vol. 8, no. 2, February 1993 (1993-02), pages 351-359, XP002109460 ISSN: 0950-9232 abstract; figure 6</p> <p>-----</p>	18,19
?		

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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Patent document cited in search report	Publication date		Patent family member(s)	Publication date
WO 0164942	A 07-09-2001	US	6818418 B1	16-11-2004
		AU	4185001 A	12-09-2001
		CA	2400058 A1	07-09-2001
		EP	1266025 A1	18-12-2002
		JP	2003525487 T	26-08-2003
		WO	0164942 A1	07-09-2001
WO 0246757	A 13-06-2002	AU	4263602 A	18-06-2002
		WO	0246757 A2	13-06-2002
		US	2002137104 A1	26-09-2002
WO 03087310	A 23-10-2003	WO	03087310 A2	23-10-2003
		US	2003215877 A1	20-11-2003